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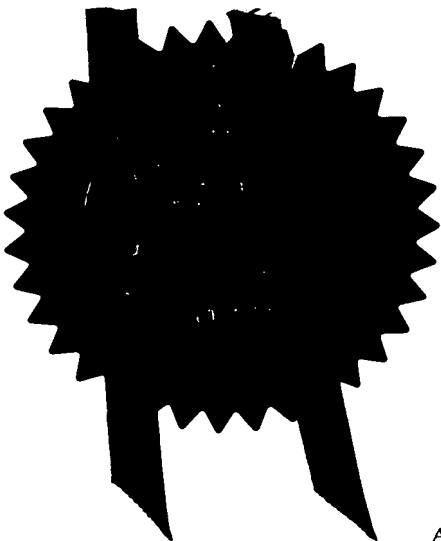
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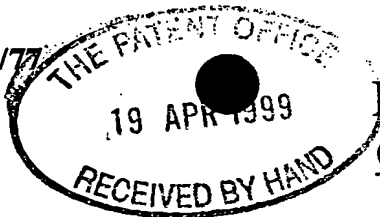
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1. Your reference

PJF10071GB

2. Patent application number

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9908917.93. Full name, address and postcode of the or of
each applicant (underline all surnames)

Cromptons Leisure Machines Limited
4 Wilton Road
Haine Industrial Estate
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Kent, CT12 5HG
England

Patents ADP number (if you know it)

If the applicant is a corporate body, give the
country/state of its incorporation

England

6054865001

4. Title of the invention

COIN PROJECTION DEVICE

5. Name of your agent (if you have one)

Elkington and Fife

"Address for service" in the United Kingdom
to which all correspondence should be sent
(including the postcode)

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TN13 1XR

Patents ADP number (if you know it)

67004 ✓

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earlier patent applications, give the country
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Priority application number
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Number of earlier application

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Patents Form 1/77

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer "Yes" if:

YES

- a) any applicant named in part 3 is not an inventor, or
- b) there is an inventor who is not named as an applicant, or
- c) any named applicant is a corporate body.

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Continuation sheets of this form	0
Description	8 /
Claim(s)	4 / <i>a</i>
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Priority documents	0
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11.

I/We request the grant of a patent on the basis of this application.

Signature

Peter Finnie

Date

19.4.99

12. Name and daytime telephone number of person to contact in the United Kingdom

Mr Peter Finnie
0171 405 3505

COIN PROJECTION DEVICE

This invention relates to a coin projection device. Such a device may be used, for example, to project coins onto a playing surface in an amusement machine.

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According to a first aspect of the present invention, there is provided a coin projection device comprising a coin entry which leads to a coin validation unit, coins validated by the coin validation unit passing to a coin stack holder, coin ejection means being provided for pushing the bottom coin in the stack onto a coin projection runway, the machine further comprising a firing mechanism for striking the edge of a coin on the runway to drive the coin along the runway thereby to project the coin.

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According to a second aspect of the present invention, there is provided a coin magazine for a coin projection device, the coin magazine comprising a coin holder for holding a stack of coins and a platform for supporting the coin stack, wherein the platform is slidable between a first position in which the coin stack is supported on the platform and a second position in which the coin stack is supported on a further, lower platform, and when the platform passes from the first position to the second position, the coin stack drops to the lower platform, and when the platform passes from the second position to the first position the lowest coin in the stack is pushed by the platform into the path of a coin firing mechanism.

The invention thus enables a stack of coins to be formed, with individual coins being fed to a runway for projection.

The validation unit is preferably provided with a first sensor for detecting whether a coin has been entered, and the runway is provided with a second sensor for detecting whether a coin is present on the runway, the coin ejection means being controlled automatically in dependence on the signals of the first and second sensors. In this way, the feed of coins onto the runway by the ejection means is automated, so that the user simply controls the firing of the coins along the runway.

The ejection means may comprise a platform for supporting the coin stack, wherein the platform is slidable between a first position in which the coin stack is supported on the platform and a second position in which the coin stack is supported on a further, lower platform, and when the platform passes from the first position to the second position, the coin stack drops to the lower platform, and when the platform passes from the second position to the first position the lowest coin in the stack is pushed by the platform onto the coin projection runway. This arrangement provides a simple structure for feeding individual coins to the runway.

The firing mechanism may comprise a hammer for striking an edge of the coin which overhangs the end of the runway, the hammer being drawn back manually against the action of a spring and being subsequently released to strike the coin. The hammer can preferably be retained in one of a plurality of possible drawn back positions by a ratchet mechanism, the ratchet mechanism being released to release the hammer.

The invention also provides a coin-operated machine comprising a plurality of coin projection devices of the invention with a single manual control for drawing back and

releasing the hammers of each machine simultaneously. The machine preferably has two coin projection devices. The machine is combined with a segmented playing surface to define an arcade-type game.

5 An example of the present invention will now be described in detail with reference to the accompanying drawings, in which:

Figure 1 is an exploded view of the components of a coin-operated machine having two projection devices of the invention;

10 Figure 2 shows in greater detail the slider mechanism incorporated in the projection devices of Figure 1; and

15 Figure 3 shows in greater detail the firing mechanism incorporated in the projection devices of Figure 1.

In the following description and claims, the term "coin" is intended to include tokens and other similar articles.

20 Figure 1 shows a machine for projecting coins, for example for use in an amusement arcade game. For example, the projecting machine may be used to project coins onto a segmented playing surface, with different areas of the playing surface being associated with different scores. The playing surface may have a series of openings leading to chutes to enable the projected coins to be recovered. The machine may thus be used

as part of an amusement arcade gambling game.

In general terms, the invention provides a coin projection device comprising a coin entry 1 which leads to a coin validation unit 3. Coins validated by the coin validation unit are passed to a coin stack holder 5, coin ejection means 7 being provided for pushing the bottom coin in the stack onto a coin projection runway 15. The machine has a firing mechanism 22 for striking a coin on the runway to drive the coin along the runway thereby to project the coin.

In more detail, the machine shown in Figure 1 essentially comprises two functionally identical (but symmetrically inverted) coin projection devices as described above, arranged side-by-side, with a single manual control 12 for operating the two devices simultaneously. The two devices are housed in a single housing comprising a top casing part 2 and a lower cradle 9. The two devices illustrated in Figure 1 are shown exploded to different degrees, for the purposes of clarity.

The machine is provided with two coin entry slots 1, each of which leads to a respective coin validation unit, in the form of a coin comparator 3. This is a standard item widely used in the amusement and vending industry to validate all types of coins and tokens. In general, two paths are provided for the coins, one path for validated coins and a reject chute 6 for rejected coins.

In the apparatus of Figure 1, the validated coins pass into a coin tube 5, which can hold a given number of validated coins. The entered coins are rotated between the slot 1

(which requires upright coins) and the coin tube 5 (which stacks the coins flat) as they travel down a coin chute. The coin tube can contain a stack of validated coins. The coin stack is positionally fixed by a coin tube holder 4, and the coins in the stack rest on one of two support platforms.

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A first support platform is in the form of a slider mechanism 7 which is slidable between a first position in which the coin stack is supported on the slider mechanism 7 and a second position in which the slider mechanism is displaced laterally away from the coin stack. In this second position, the coin stack is supported on a second, lower platform 70.

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The movement of the slider mechanism between the two positions is controlled by a solenoid 13, the central moveable core of which is coupled to the slider mechanism by a link arm arrangement 14. This is shown in greater detail in assembled form in Figure 2.

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The thickness of the first platform is slightly less than the thickness of a valid coin, and the first platform is provided directly over the second platform 70. When the first platform passes from the first position to the second position, the coins in the stack drop to the second platform. When the first platform passes back from the second position to the first position, it pushes out only the lowest coin in the stack, and the remainder of the stack is then supported once again on the first platform.

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The coin which is pushed out passes through a slot 20 and lands on a runway in the

form of a coin ramp 15. The coin lands on the coin ramp 15 in such a position that a portion of the edge of the coin overhangs the end of the ramp 15. A sensor 18 is associated with the ramp for detecting whether or not a coin is in position at the end of the ramp. This sensor may comprises a pressure sensor or a light source and detector arrangement for detecting light reflected by the coin, when present. The ramp 15 presents a slight incline, so that a coin driven along the ramp will be elevated.

A hammer 22 is provided for striking the edge of the coin to project the coin along the ramp 15. The ramp may have an end deflector part 16 arranged at an angle to the main part of the ramp 15, to give the projected coin additional elevation, and/or to impart a tossing motion to the coin and to control the direction of the coin.

The hammer 22 is drawn back under the control of a manual handle 12 against the bias of a torsion spring 11. The lever is mounted on bearings 24 provided on support plates 26 on either side of the handle 12. As will be explained in greater detail with reference to Figure 3, a ratchet mechanism is provided to give a number of different power settings for the hammer action. In an alternative arrangement a tension spring may be fixed to the handle 12 so that the handle is spring loaded (not shown).

A solenoid control board 8 is mounted on the cradle 9 for automatic control of the solenoid 13, which in turn effects the loading of the bottom coin in the coin stack onto the ramp 15. The signals from the ramp sensor 18 and the sensor in the coin comparator 3 are supplied to a main control unit (not shown), which has appropriate software to generate command signals which are supplied to the control board 8 for

driving the solenoid 13.

5 The control is such that the solenoid will be actuated to load a coin onto the ramp 15 from the bottom of the stack, provided there is a coin in the stack (as determined by the comparator sensor) and as soon as a coin has been projected off the ramp (as detected by ramp sensor 18). The comparator sensor is arranged to count the number of validations, and derive from this the number of coins in the stack depending upon the number of times the solenoid has been activated. In the latter case, the sensor comprises a latch which is triggered each time a validated coin passes through the
10 comparator. The solenoid may then be actuated an equal number of times to the number of validations, to ensure that all valid coins have been projected.

Figure 2 shows the arrangement for providing coins to the ramp in greater detail, and in assembled form. As shown, the solenoid 13 includes a central slidable core 130
15 which is coupled by the link arm 14 to the slider 7. The slider 7 has a downward projection 17 which extends through a slot 72 in the lower platform 70 (shown in Figure 1), and the projection 17 passes between two pins 140 of the link arm 14 so that the link arm 14 can drive the platform 7 in both directions.

20 The movement of the slider 7 away from the coin stack is under the control of the solenoid 13, but the return is under the control of a return spring 29. Thus, in the normal idle state of the machine, with the coin stack supported on the slider 7, no solenoid control signal is needed. In an alternative arrangement, the return action may be provided by a conical spring fixed to the core 130 itself (not shown).

Figure 3 shows in greater detail the handle assembly. The handle can be drawn back to a limited extent as dictated by a stop bar 28 having a rubber cover. As the handle is drawn back (i.e. rotated clockwise in Figure 3), a ratchet 30 is caused to move past a latch 32 by means of a linkage 34. The latch 32 is sprung anticlockwise in Figure 3 so that the ratchet is retained in the drawn back position, against the bias of the torsion spring 11. The hammer 22 is coupled to the ratchet 30.

In the example shown in Figure 3, four ratchet positions are provided. To release the hammer 22, the latch 32 must be lifted to disengage the ratchet. This can be achieved manually by returning the handle to the position shown in Figure 3, in which a lip 34 lifts the latch 32.

Thus, as the handle is drawn back, the ratchet clicks corresponding to an increase in the hammer power. Once the desired number of clicks has been heard (from 1 to 4 for the Figure 3 embodiment), the handle is returned to the starting position to release the hammer.

The exact nature of the games in which the projection device may be employed has not been described in detail, since numerous possibilities will be apparent to those skilled in the art. Furthermore, various modifications to the specific implementation of coin projecting device described will be apparent.

CLAIMS

1. A coin projection device comprising a coin entry which leads to a coin validation unit. coins validated by the coin validation unit passing to a coin stack holder, coin ejection means being provided for pushing the bottom coin in the stack onto a coin projection runway, the machine further comprising a firing mechanism for striking the edge of a coin on the runway to drive the coin along the runway thereby to project the coin.

2. A coin projection device as claimed in claim 1, wherein the validation unit is provided with a first sensor for detecting whether a coin has been entered and the runway is provided with a second sensor for detecting whether a coin is present on the runway, the coin ejection means being controlled automatically in dependence on the signals of the first and second sensors.

3. A coin projection device as claimed in claim 1 or 2, wherein the ejection means comprises a platform for supporting the coin stack, wherein the platform is slidable between a first position in which the coin stack is supported on the platform and a second position in which the coin stack is supported on a further, lower platform, and when the platform passes from the first position to the second position, the coin stack drops to the lower platform, and when the platform passes from the second position to the first position the lowest coin in the stack is pushed by the platform onto the coin projection runway.

4. A coin projection device as claimed in any preceding claim, wherein the firing mechanism comprises a hammer for striking an edge of the coin which overhangs the end of the runway.

5 5. A coin projection device as claimed in claim 4, wherein the hammer is drawn back manually against the action of a spring and is subsequently released to strike the coin.

10 6. A coin projection device as claimed in claim 5, wherein the hammer is retained in one of a plurality of possible drawn back positions by a ratchet mechanism, the ratchet mechanism being released to release the hammer.

15 7. A coin projection device as claimed in any preceding claim, wherein the runway comprises in series first and second portions having an abrupt direction change at the boundary.

8. A coin projection device substantially as shown in and/or described with reference to any of the accompanying drawings.

20 9. An amusement machine comprising a coin projection device as claimed in any preceding claim and a playing surface onto which the coins are projected.

10. A coin projection machine comprising a plurality of coin projection devices as claimed in any preceding claim, wherein the machine comprises a single manual control

for operating simultaneously the firing mechanism of each device.

11. An amusement machine comprising a coin projection machine as claimed in claim 10 and a segmented playing surface onto which the coins are projected.

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12. A coin magazine for a coin projection device, comprising a coin holder for holding a stack of coins and a platform for supporting the coin stack, wherein the platform is slidable between a first position in which the coin stack is supported on the platform and a second position in which the coin stack is supported on a further, lower platform, and when the platform passes from the first position to the second position, the coin stack drops to the lower platform, and when the platform passes from the second position to the first position the lowest coin in the stack is pushed by the platform into the path of a coin firing mechanism.

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13. A coin magazine according to claim 12, in which movement of the platform between the two positions is controlled by a solenoid, the moveable core of which is coupled to the platform by a link arm.

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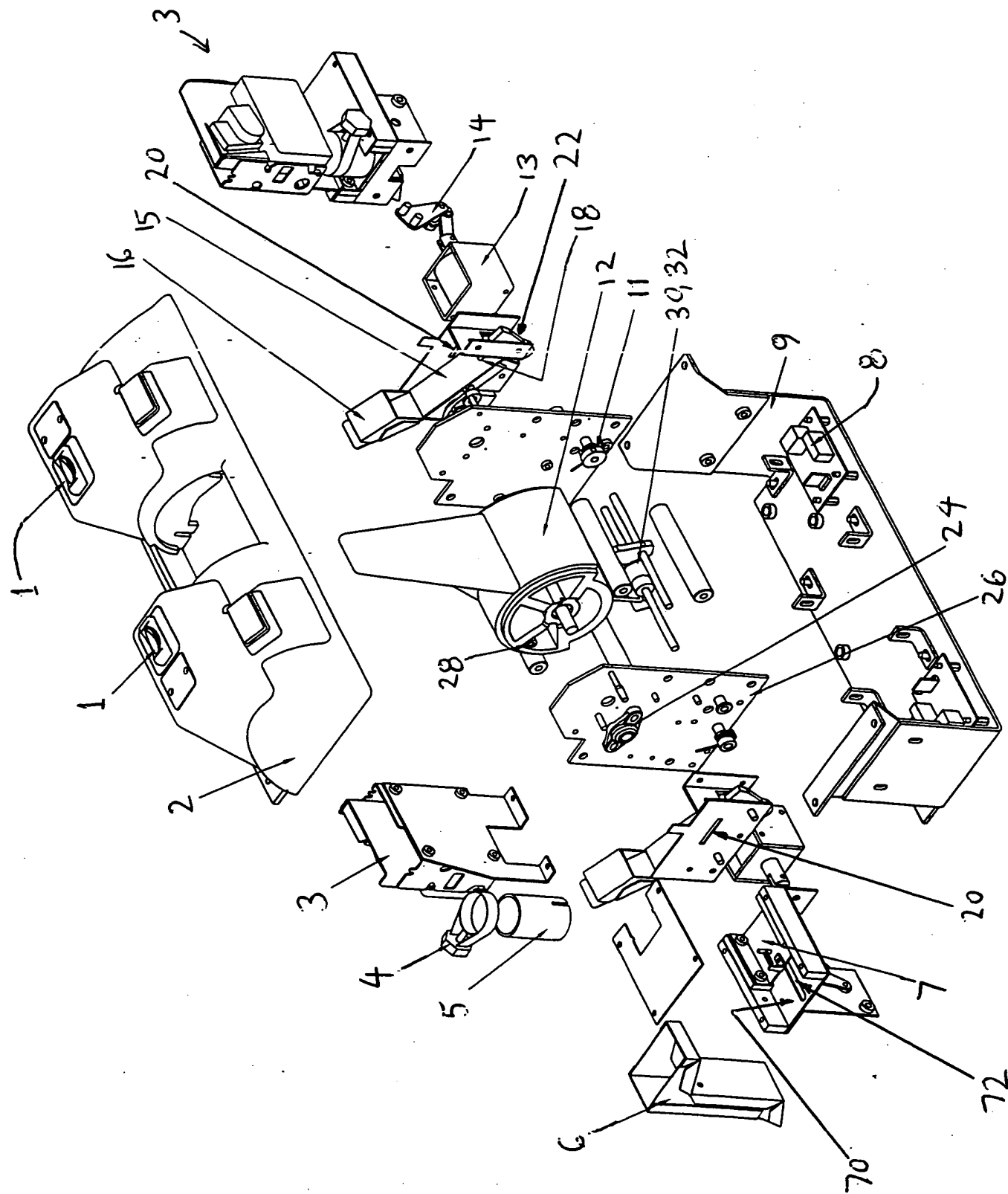
14. A coin magazine according to claim 13, in which the solenoid is arranged to provide movement of the platform away from the coin stack to the second position and a spring is provided to return the platform to the first position.

15. A coin magazine according to claim 13 or 14, in which actuation of the solenoid is controlled in dependence on a sensor which determines whether or not a coin is

present in the coin holder.

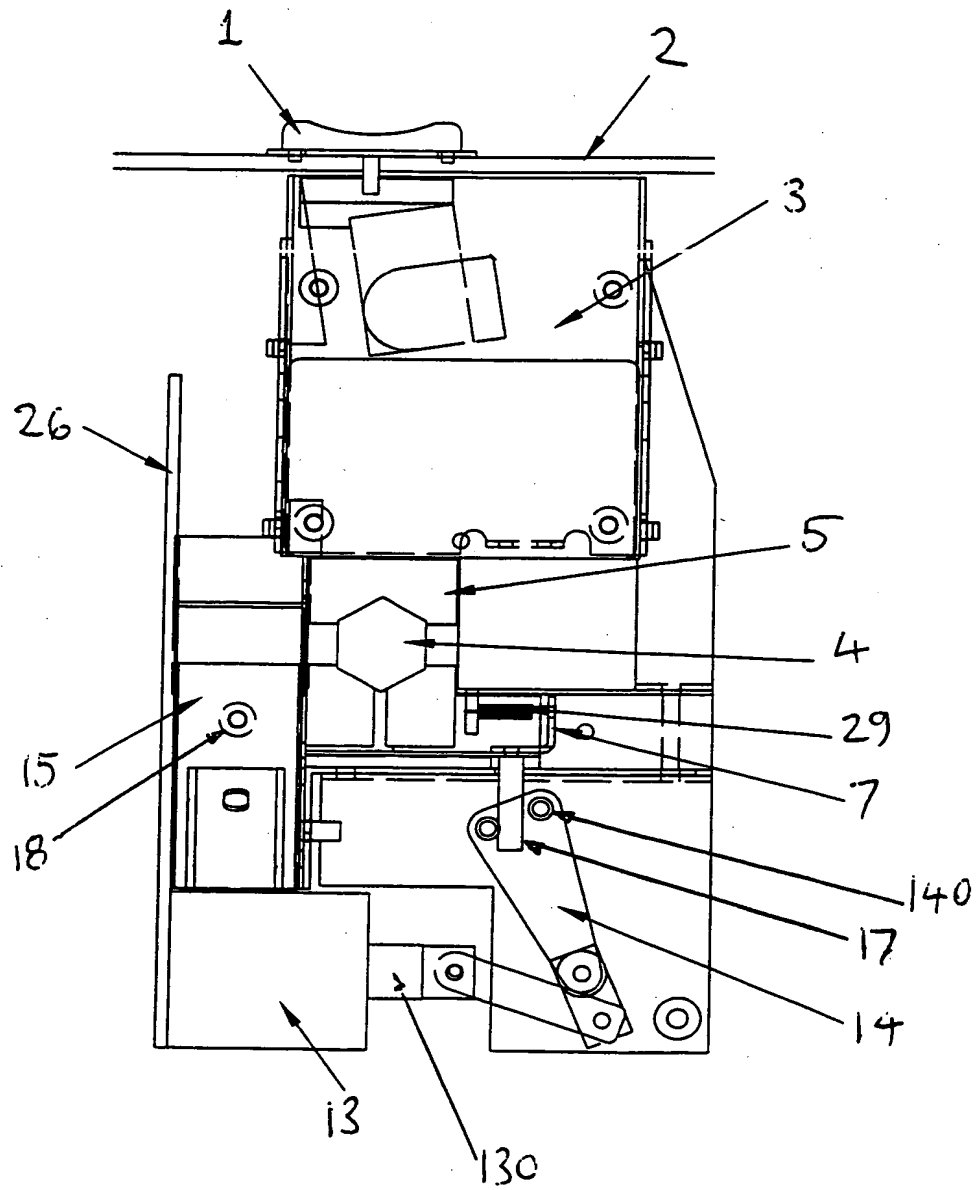
16. A coin magazine substantially as shown in and/or described with reference to any of Figures 1 and 2 of the accompanying drawings.

FIG 1



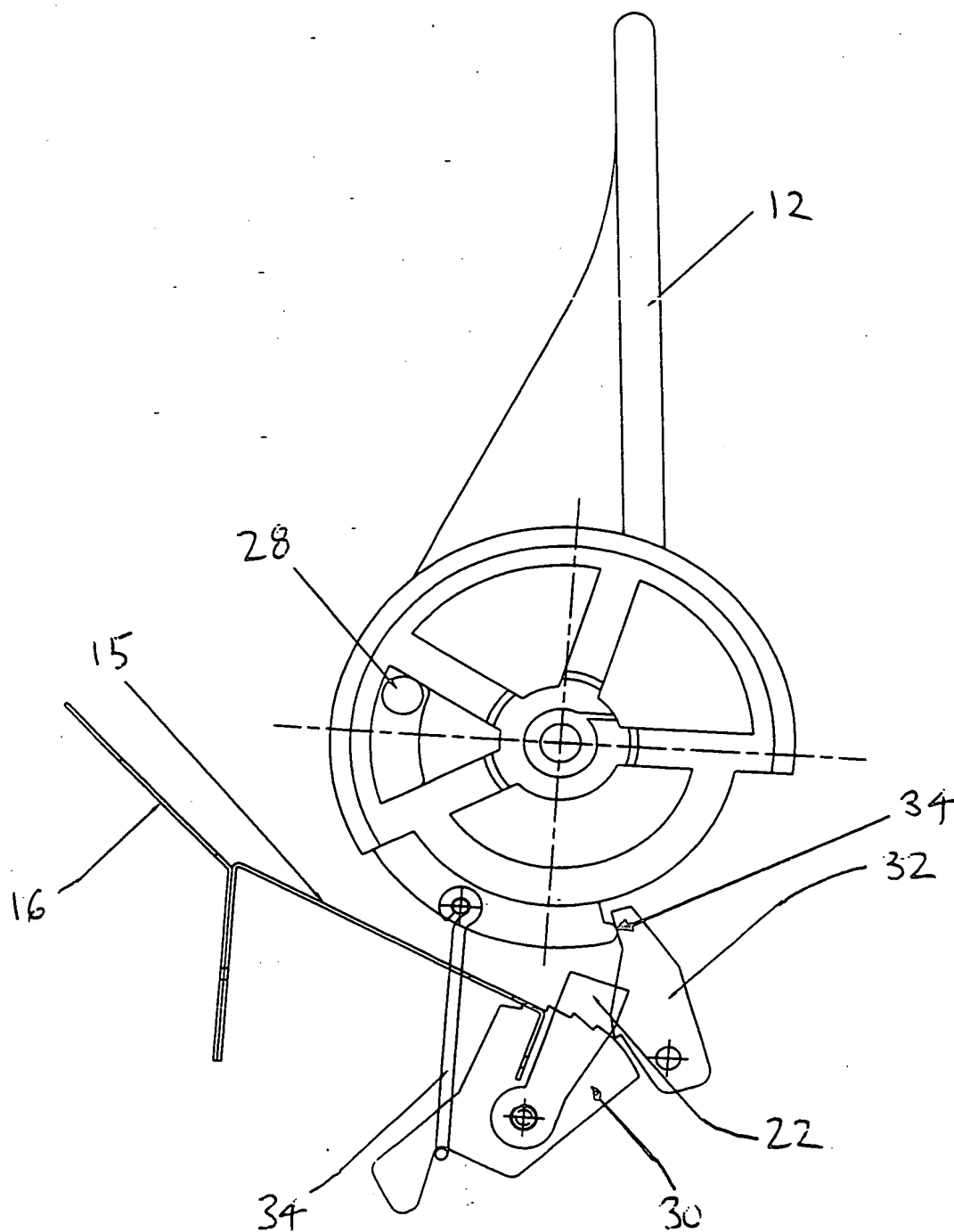
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Fig 2 2/3



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FIG 3



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